matter, thus adopting a plan which ENGLER had previously adopted in the *Pflanzenreich*.

Following the preface is a German summary of the contents of the volume by DRUDE. Part I gives a survey of floristic and phytogeographic work in North America, and also a most useful bibliography. Part II contains an account of the geography and climate of the continent, together with some plant statistics. Part III has to do with the geologic evolution of the North American flora from the Cretaceous to the present. Here there are discussed the sudden appearance of Cretaceous angiosperms, and the influence of Pleistocene glaciation in the destruction of species and in the production of relict endemism. A detailed account is given of the postglacial history of our flora. To the north there has been a succession of forest types, culminating in the dicotyl forests which now generally dominate. Interesting accounts are given of recent changes in the vegetation of the coastal plain. HARSHBERGER aligns himself with those who regard the prairies as sufficiently explained by taking account of historical factors. This part closes with a description of the affinities of the North American flora and a list of phytogeographic classifications pertaining to North America.

Part IV, which comprises more than half of the volume, presents in some detail the phytogeographic regions of North America, and is accompanied by a colored map which makes it easy to follow the text. There are seven chapters, dividing the continent into as many "zones": (1) The arctic and subarctic zones; the latter is subdivided into the Labrador, Hudson Bay-Keewatin, Mackenzie, and Alaska districts. (2) The North American temperate zone, Atlantic section; subdivided into the St. Lawrence–Great Lake, Atlantic–Gulf Coast, and Piedmont-Appalachian-Ozark regions. Among the districts most fully treated are New Brunswick (based largely on GANONG'S studies), the New England mountains, the Adirondacks, the New Jersey pine barrens, the coastal formations, and the various forest districts. (3) The North American temperate zone, interior xerophytic sections; subdivided into the prairie, Rocky Mountain, and Great Basin regions. (4) The North American temperate zone, Pacific section; subdivided into the Sitkan, Columbian, and Californian regions. (5) The Mexican subtropic zone and mountain regions. (6) The North American tropic zone, Mexican and Central American section. (7) The North American tropic zone, West Indian section. The illustrations are good, but are much too few to depict properly the vegetation of a continent.—HENRY C. COWLES.

NOTES FOR STUDENTS

Cecidology.—The similarity of plant galls and animal tumors is attracting the attention of workers in various parts of the world. SAUL[2] has issued a preliminary paper in which he expresses the opinion that some of the various

[2] SAUL, E., Beziehungen der Acari zur Geschwulstatiologie. Centrabl. f. Bakt., Paras., und Infekt. **59**:400–406. 1911.

cancerous growths of animals may be due to insects, and that improved technique will throw light upon the problem. He expresses regret that the progress of this line of work has been so slow, and reviews some of BEIJERINCK's works which he believes have the most important bearing on the subject. He believes that the insect (larva) secretes an enzyme which causes a proliferation of the body cells without changing their physiological function, and that this enzyme can be transferred from cell to cell. The possibility of insects being the cause of such growths in animals was taken up in Krebs Institute in Heidelberg in connection with the study of an endemic disease of rats. The rats suffered from an infectious disease causing papillose tumors, but the technique was not satisfactory in demonstrating the exact cause. The author presents a number of microphotographs of insects and sections of plant galls, which he discusses in relation to their similarity to animal tumors. He also briefly reviews the works of several authors who have expressed similar opinions.

One of the most valuable discussions concerning the character and grouping of galls is by KÜSTER,[3] who suggests a division of the galls into two groups, "histoide" and "organoide." The former includes such simple structures as cork formed about wounds, and the more complex structures such as oak galls, which, although made up of plant tissue, are unlike any of the plant organs. The latter includes the formation of roots from a leaf, those modifications of stems and leaves which are usually known as teratological structures, and those modifications of parts which are due to fungi and insects. The author discusses the modification of the leaves of the willow due to *Aphis amenticola*, the witches' brooms of the cherry, birch, and fir trees due to *Exoascus cerasi*, *E. betulinus*, and *Melampsorella caryophyllacearum*, the cone gall of *Salix caprea* which is due to *Rhabdophaga rosaria*, the leaf modifications of *Populus tremula* which are due to *Eriophyes dispar*, the formation of new roots on *Poa silvestris* due to *Cecidomyia poa*, the formation of adventitious parts on *Fraxinus ornus* and *Pteris quadriaurita* due to *Eriophyes fraxini* and *Taphrina laurencia*, as illustrating the various types of organoides. This is followed by a brief discussion of a number of insect and fungus galls which possess characters of both histoides and organoides. The author attaches no importance whatever to the cause, but bases his classification entirely on the character of the deformity without regard to the fungus or insect which produces the stimuli.

A brief but very interesting paper by HARRIS[4] shows that as vague a subject as teratology may present problems for serious investigation. His studies indicate that the anomalous fruits of *Ptelea trifoliata* are rare, the greatest variant being less than 1 per cent. Although the author states that he considers the number of pods studied entirely too small for satisfactory

[3] KÜSTER, E., Ueber organoide Misbildungen auf Pflanzen. Aus der Natur. **7**:673–685. 1911.

[4] HARRIS, T. ARTHUR, Teratological fruits of *Ptelea*. Bull. Torr. Bot. Club **38**:385–387. 1911.

conclusions, yet his paper demonstrates one of the many possibilities in this branch of cecidology.

Among the more important taxonomic papers is LEEUWEN-REIJNVAAN'S[5] fifth contribution on the galls of Java. They describe 49 different galls, 21 of which are figured. These galls are grouped with reference to the plants on which they occur, and are assigned to genera but not given specific names.

MASSALONGO[6] describes 8 new species of galls, 7 of which are due to insects and 1 to fungi.—MEL T. COOK.

Sand dune and subalpine vegetation in New Zealand.—With a sand dune area of some 300,000 acres, the question of its reclamation becomes one of national importance in New Zealand, especially since through their advance the dunes ruin much valuable land. In a previous paper by COCKAYNE, reviewed in this journal,[7] the ecological problems of these areas were discussed, and the influence of pasturing, tree cutting, and burning was noted as increasing the movement of the dunes to a marked degree. In a more recent publication,[8] the same investigator has restated many of his former conclusions, and in addition has discussed the best methods for reclaiming actively moving dunes, for protecting farm lands and other valuable areas from the encroaching sand, and for preventing the rejuvenescence of fixed dunes. The efficiency of marram grass (*Ammophila arenaria*) as a sand holder is emphasized, while the tree lupin (*Lupinus arboreus*) is found to be an excellent shrub to reinforce the grass and to act as a pioneer in the process of reforestation, which is recognized as offering the greatest permanent stability combined with the transformation of a barren and dangerous into a productive region. Some action by the New Zealand Government seems likely to result from these recommendations.

COCKAYNE and his associates have also been making a preliminary ecological survey of a mountainous area in the Southern Alps region of New Zealand.[9] The highest peak here is Mt. Arrowsmith, 9171 ft., and it is surrounded by others of somewhat less altitude. Glaciers occur rather plentifully, and the region gives evidence of much more extensive ice sheets in the past. Two climatic regions are here closely adjacent, due to differences in rainfall depend-

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[5] LEEUWEN-REIJNVAAN, J. und W. DOCTERS VAN, Einige Gallen aus Java. V. Marcellia **10**:65–91. 1911.

[6] MASSALONGO, C., Zoocecidii e fitocecidii rare o nuovi. Marcellia **10**:94–97. 1911.

[7] BOT. GAZ. **50**:478. 1910.

[8] COCKAYNE, L., Report on the dune areas of New Zealand, their geology, botany, and reclamation. Department of Lands. 4to. pp. 76. *pls.* 72. 1911. Wellington: John Mackay, Government Printer.

[9] SPEIGHT, R., COCKAYNE, L., and LAING, R. M., The Mount Arrowsmith district; a study in physiography and plant ecology. Trans. N.Z. Institute **43**:315–378. 1911.